

STORAGE RING / BOOSTER RF COUPLER INSTALLATION
APPROVAL SHEET

Serial No. _____

*Fabricated and inspected per Coupler Production Traveler. Yes _____ No _____

Comments _____

Responsible Mechanical Engineer _____ Date _____

*Cleaned and baked for ultra high vacuum environment. Yes _____ No _____

Comments _____

Responsible Vacuum Engineer _____ Date _____

*RF Conditioned Yes _____ No _____

Comments _____

Responsible RF Engineer _____ Date _____

Group Leader _____ Date _____
(ASD/ME)

Comments _____

Group Leader _____ Date _____
(ASD/RF)

Comments _____

STORAGE RING / BOOSTER RF COUPLER PRODUCTION TRAVELER

Serial No. _____

Responsible Engineer _____

Parts Machined by _____

***Visual Inspection**

Inspect component parts for nicks, dents and scratches to electropolished surfaces and to knife-edges on vacuum flanges.

Comments _____

***Send parts to ANL Inspection Department for inspection of critical dimensions.**

Inspected by _____ Date _____

Inspection Results _____

PRE-ASSEMBLY CLEANING PROCEDURE

Clean all component parts, except for the ceramic window assembly, in 2% citronox solution, using ultrasonics for 20 minutes. Rinse in de-ionized water, and then dry with hot nitrogen. Wrap parts in aluminum foil.

***Note:** Care should be taken to minimize nicks and scratches to electropolished surfaces of components and to knife-edges on vacuum flanges.

Cleaned by _____ Date _____

CERAMIC WINDOW ASSEMBLY (Drawing #31040101-230200)

Assembly Serial No. _____

Manufactured by _____

CLEANING PROCEDURE

Clean ceramic window in 2% citronox solution using flow process only. Rinse in deionized water, then dry with hot nitrogen. Bake at 150 °C for 8 hours. Wrap in aluminum foil.

***NOTE: Do not use ultrasonics during cleaning. This process can cause pitting in the surfaces of the ceramic.**

Cleaned and Baked by _____ Date _____

Bake Temperature _____ Time Held _____

VACUUM LEAK TESTING

Leak test done by _____ Date _____

Sensitivity _____

Test Results _____

CERAMIC COATING

Coat the inside surfaces only, of ceramic window with titanium to a thickness of 30-50 Angstroms.

Coated by _____ Date _____

Samples for measurement: YES _____ NO _____

Thickness measured on samples _____

Comments _____

CENTER-CONDUCTOR ASSEMBLY (31040101-230300)

* **Note:** The center-conductor is made of copper with electropolished-finished surfaces. Care must be taken during the brazing, welding and hydrostatic pressure testing processes to prevent nicks, dents and scratches to these surfaces. Wear gloves at all times. Assemble and test in environments free from oils, grease and other contaminants incompatible with ultra high vacuum conditions.

Braze component parts per drawing #31040101-230310

Brazed by _____ **Date** _____

***Visually inspect brazed joints.**

Comments _____

WELD PROCESS

Weld component parts per drawing #31040101-230300

Welding done by _____ **Date** _____

HYDROSTATIC PRESSURE TEST PROCEDURE

Hydrostatically test water joints at 250 psi for 30 minutes.

Tested by _____ **Date** _____

Test Pressure _____

Test Results _____

Visually inspect assembly for nicks, dents and scratches.

Comments _____

COUPLER BODY ASSEMBLY

Component parts are cleaned for an ultra high vacuum environment. Wear gloves at all times. Assemble and test in environments free from oil, grease and other contaminants incompatible with ultra high vacuum conditions.

FIRST BRAZING PROCEDURE

Braze component parts per drawing #31040101-230120

Brazed by _____ Date _____

COUPLER BODY WELDING

Weld component parts per drawing #31040101-230110

Weld by _____ Date _____

HYDROSTATIC PRESSURE TEST PROCEDURE

Hydrostatically test all brazed and welds joints at 250 psi for 30 minutes.

Tested by _____ Date _____

Test Pressure _____

Test Results _____

SECOND BRAZING PROCEDURE

Braze component parts per drawing #31040101-230100

Brazed by _____ Date _____

Visually inspect condition of brazed joints

Comments _____

VACUUM LEAK TESTING

Vacuum leak test brazed joints per drawing #31040101-230100

Leak test done by _____ Date _____

Sensitivity _____

Test Results _____

CERAMIC WINDOW, BODY AND CENTER CONDUCTOR ASSEMBLY

Assemble component parts per drawing #31040101- 230500.

***Note:** Component parts are cleaned for ultra high vacuum environment. Wear gloves at all times. Assemble and test in environments free from oil, grease and other contaminants incompatible with ultra high vacuum conditions.

Assembly preparation for electron beam welding

(Preferably performed by M/E RF support Technician or Engineer)

- Install threaded insert (31040101-230302) into center conductor.
- Secure the coupler body assembly to a storage vessel using a copper gasket and ~4 bolts.
- Insert the ceramic window into the coupler body assembly. If necessary, **gently** tap the ceramic into the body ring with a small soft mallet and vacuum wipe, to ensure proper seating.
- Align the mini-conflat on the center conductor with the loop on the body assembly before pressing the center conductor all of the way into the ceramic window. Use the fixturing devices attached to the center conductor head and the body assembly waveguide flange for proper alignment. The waveguide flange- screws of the fixtures may need to be used to pull the three sections together. Turn the screws one at a time, no more than ¼ turn until the center conductor is seated.
- Inspect the unit for proper seating. Use a depth gauge to measure from the top of the center conductor to the waveguide flange, in several places. $\sim 5.695 \pm .005$
- Remove the unit from the storage vessel with the fixturing still in place, and install the Glidcop screw and washer.
- Inspect the unit for center conductor concentricity. Measure from the center conductor O.D. to the copper cylinder I.D. in several places. $\sim 1.136 \pm .005$
- Send the assembled coupler with fixturing for welding. Remove the fixturing once transport is complete.

Assembled by _____ Date _____

Comments _____

WELD PROCESS

Electron-beam weld per drawing #31040101-230500

***Note: Shield ceramic window from damage during electron beam welding process.**

Welding done by _____ Date _____

***Visually inspect ceramic window for damages.**

Comments _____

VACUUM LEAK TESTING

Vacuum leak test weld joints per drawing #31040101-230500

Leak test done by _____ **Date** _____

Sensitivity _____

Test Results _____

RF ENGINEER INSPECTION

Inspected by _____ Date _____

Comments _____

***Send assembly to Vacuum Group for cleaning and final assembly.**

GENERAL ASSEMBLY

Assemble component parts per drawing #31040101- 230000.

***Note:** Component parts are cleaned for ultra high vacuum environment. Wear gloves at all times. Assemble and test in environments free from oil, grease and other contaminants incompatible with ultra high vacuum conditions.

***Disassemble glidcop screw and washer from loop and center conductor and clean separately for re-assembly after cleaning and baking.**

Screw and washer removed prior to cleaning: YES _____ NO _____ Initials _____

***Visual Inspection**

Inspect final assembly for nicks, dents and scratches to surfaces surrounding the loop and to knife-edges on vacuum flanges.

Comments _____

POST-ASSEMBLY CLEANING PROCEDURE AND STORAGE

Clean assembled couplers in 2% citronox solution, using the flow process only. Rinse in deionized water, then dry with hot nitrogen. Bake in oven at 200 °C for 16.0 hours.

Cleaned and baked by _____ Date _____

ASSEMBLE THE FOLLOWING:

***(These steps to be performed by Mechanical RF support personnel)**

- 1. Center-conductor and loop using glidcop screw (31040101-230003) with curved spring washer:**

YES _____ NO _____ INITIAL _____

- 2. Tighten screw (Snug only – Do not over-tighten)**

YES _____ NO _____ INITIAL _____

- 3. Assemble electron probe detector (31040101-230320). Serial No _____**

YES _____ NO _____ INITIAL _____

- 4. Place coupler in storage canister and leak check.**

VACUUM LEAK TESTING

Leak test done by _____ **Date** _____

Sensitivity _____

Test Results _____

ELECTRON PROBE DETECTOR (31040101-230320)

Assembly Serial No. _____

FIRST ASSEMBLY PROCEDURE:

Assemble and machine component parts per drawing (31040101-230360).

VACUUM LEAK TESTING

Vacuum leak test weld joints per drawing #31040101-230360

Leak test done by _____ Date _____

Sensitivity _____

Test Results _____

FINAL ASSEMBLY PROCEDURE:

Assemble component parts per drawing (31040101-230320).

CLEANING PROCEDURE

Clean assembly in 2% citrox solution using ultrasonics, for 20 minutes. Rinse in deionized water, then dry with hot nitrogen. Bake in oven at 150 °C for 8.0 hours. Leak check and wrap in aluminum foil.

Cleaned and Baked by _____ Date _____

VACUUM LEAK TESTING

Vacuum leak test weld joints per drawing #31040101-230320

Leak test done by _____ Date _____

Sensitivity _____

Test Results _____